"Building a Large Online University: Why Interoperability is the Holy Grail"

Jack M. Wilson,
CEO, UMassOnline
And
Vice President, Professor
The University of Massachusetts

A personal journey

- Began career as a research physicist
- Research required high performance computing
- Why are students not learning about this (MUPPET)?
- How can this help learning?
- Restructuring physics and engineering ed.(CUPLE)
- Computing Communication Cognition ->
  The Studio Classroom
- Restructuring Undergraduate Program
  - Hesburgh Award, Boeing Award, Pew Prize
- How can the studio experience work at a distance?
  - LearnLinc Corporation
- How can online programs serve the needs of working professionals.
 - UMassOnline   RSVP

The Tower of Babel

- When I arrived in 2001, UMass was running eight (8) different learning management systems in production.
  - Three home grown
  - Five Commercial
- Nearly completely down to UMassOnline Platform at this point with one major exception.
- 11,239 new external students
- 10 million in external revenue
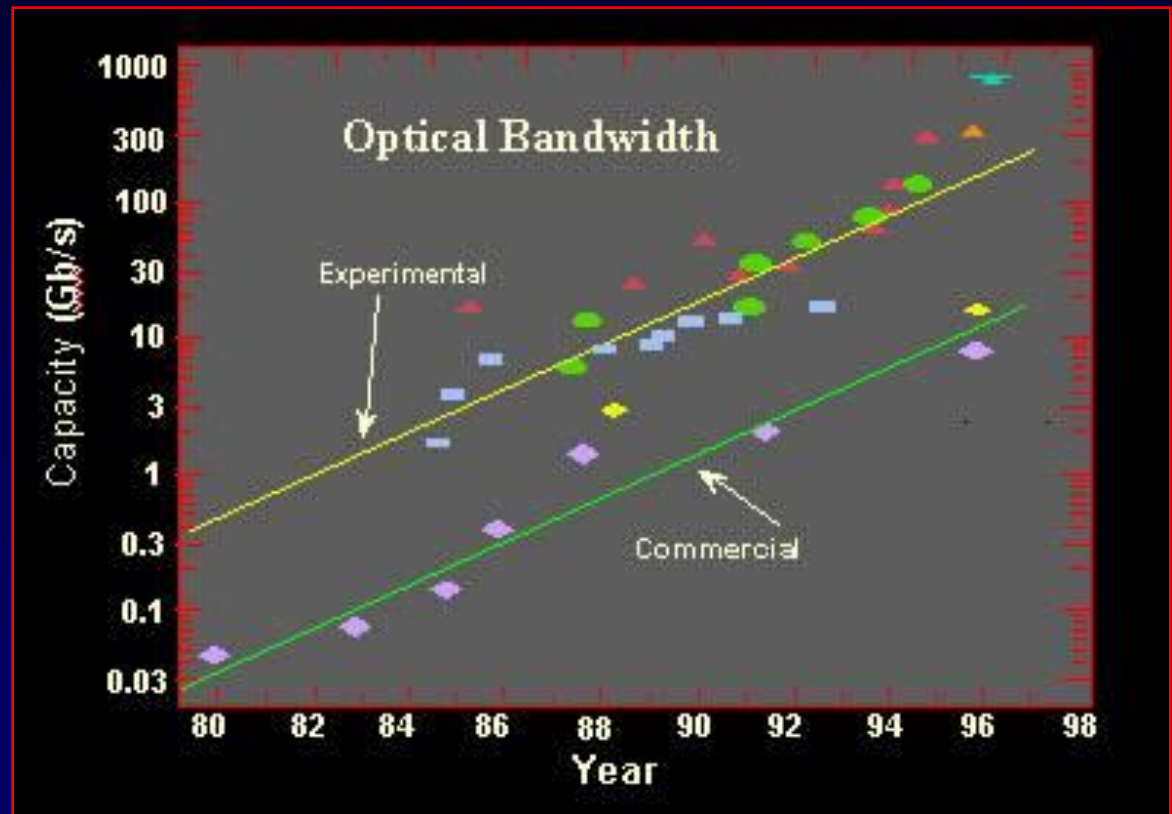
I. Wilson's Favorite Laws!

I. Moore's Law:

- CPU performance doubles every 18 months.
- Cost of equivalent computing power halves
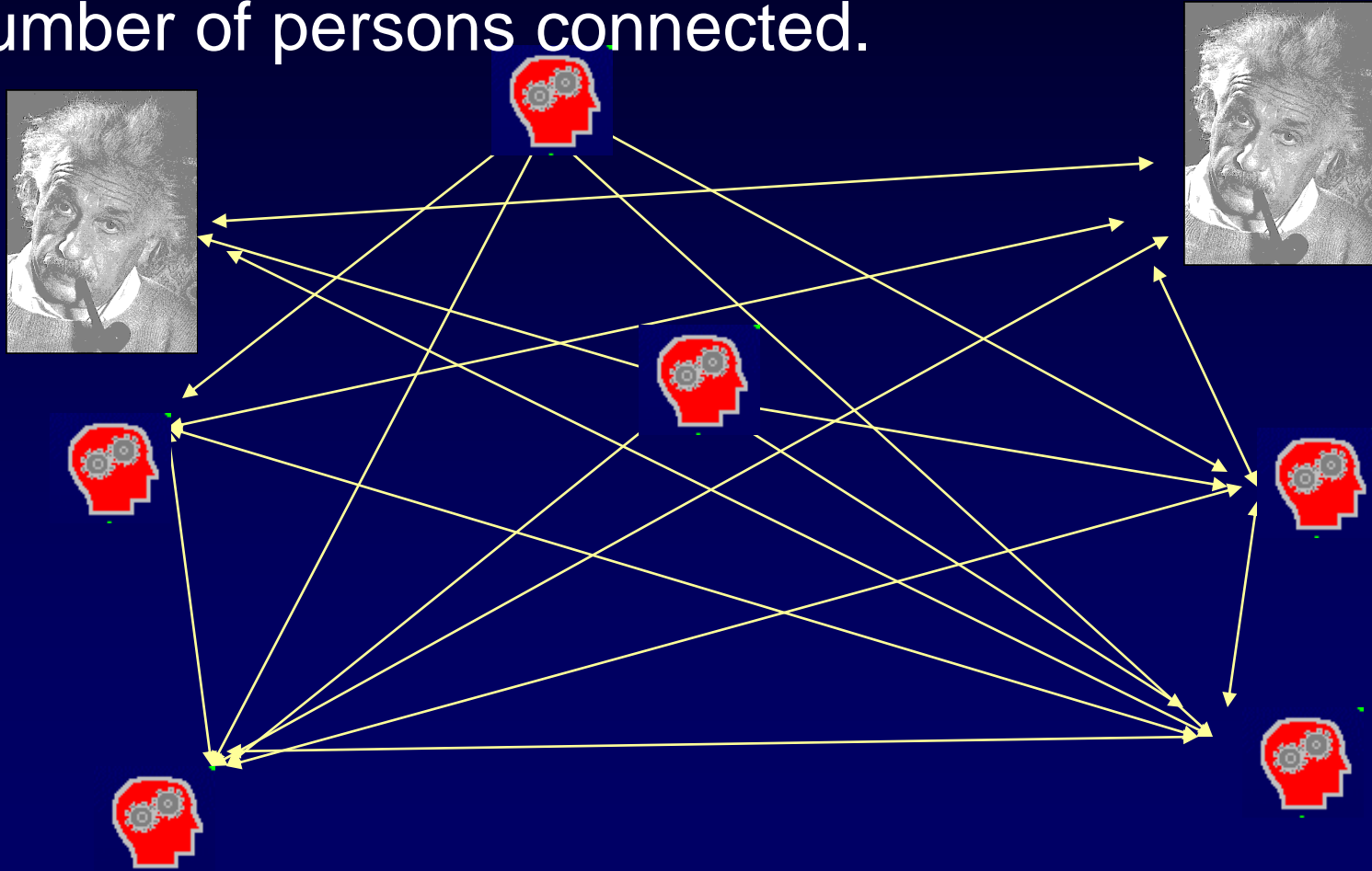- Basic physics drives this.
  - CMP, etc.
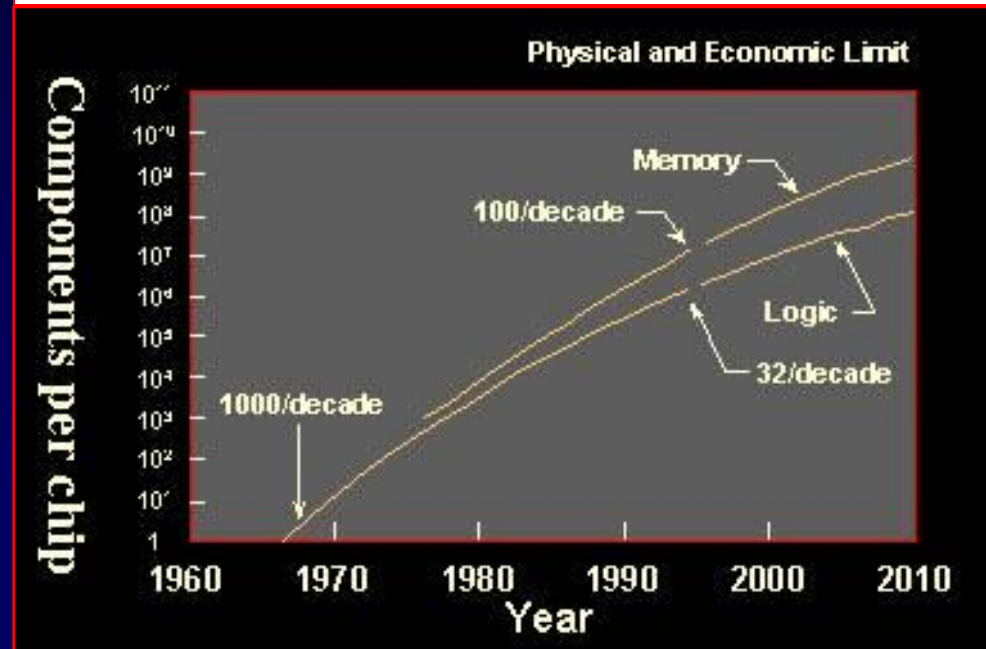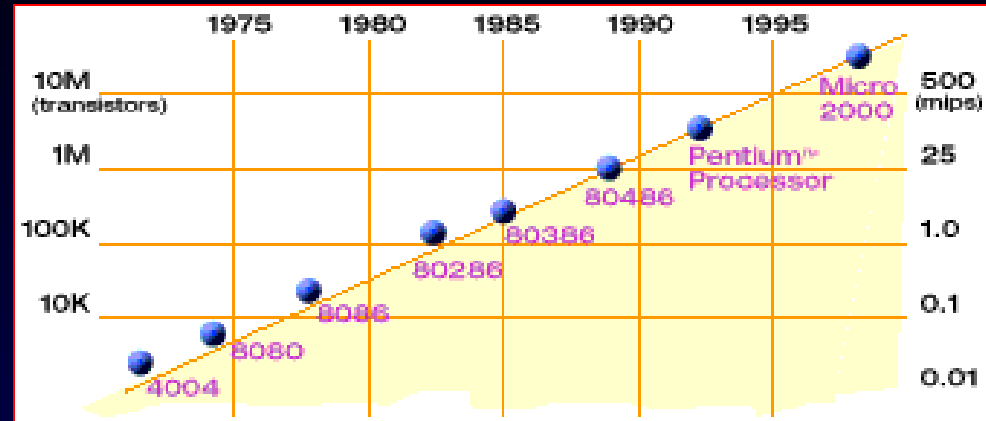
II. Wilson's Favorite Laws!

- II. Bandwidth law:
  Bandwidth is doubling even faster!

- III. Metcalf's Law:
  the value of a network scales as n^2 where n is the number of persons connected.
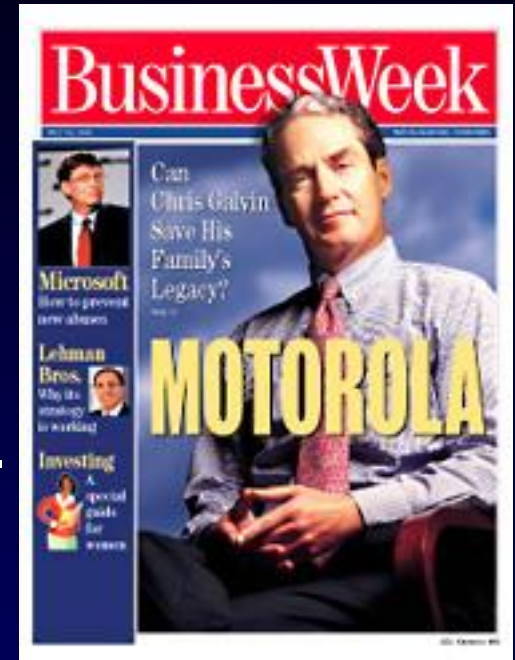
The horrible mismatch

- People change very slowly

- Technology changes very rapidly

- Do you feel like you are herding cats?

The Forty Year Degree

- Christopher Galvin,
  President Motorola:

- We are not hiring any more graduates with four year degrees.

- We want employees
  with forty year degrees

High hopes for eLearning

- Columbia formed Fathom & teamed with XanEdu.
- U. of Penn Wharton School teamed with Caliber, a spin-off from Sylvan Learning.
- Cornell spun off eCornell with $12 million internal investment
- UNext created Cardean University with Columbia, London School of Economics, Carnegie Mellon, Stanford, and Chicago.
    - Reportedly Cardean pledged to pay Columbia, and perhaps the others, $20 million dollars if they failed within five years.
- Temple formed "Virtual Temple"
- Pensare teamed up with Duke.
- Click2Learn teamed with NYU Online.
- North Carolina, Harvard, and USC went to University Access for help in getting online.
- Harcourt Higher Education was launched as a college in 2000 and confidently predicted "50,000 to 100,000 enrollments within five years."

And Now?

- **Pensare** is gone.
- **Fathom** needed ~$30 million in internal financing
  - Faculty became restive, closed in early 2003
- **Cardean** laid off over half work force –"restructures".
- **Temple** University closed virtual Temple.
- NYU folded **NYUOnline** back into the campus.
- **Harcourt** gone after enrolling 32 students in 2001.
- **eCornell** open BUT with reduced expectations.
- Britain's **Open U**. closes US branch -$20 M later.
- **Caliber** goes bankrupt- acquired by iLearning(Sylvan).
- **University Access** -> Quisic withdraws from H.Ed.

So?

- Has Online learning failed?

- Hardly!
  - The Red Sox, the Cubs, and 29 other teams didn't win the world series again last year either.

- Just like baseball, distance learning has it's winners and losers!

UMassOnline

- UMassOnline ended the year 2002 with
    - over $10 million in revenues
    - 11,239 enrollments from students outside campuses
    - an annual growth of 50%
    - 38 (and growing) degree and certificate programs
    - Serving the educational needs of students in Massachusetts, New England, and the U.S.
    - Over 450% growth in inquiries through it's web site
    - 55% of inquiries from outside Massachusetts.
    - 8% of inquiries from outside the U.S.

A few successful on-line initiatives

- Arizona Regents University   12,353 Ex
- Univ. of Maryland Univ. Coll.   68,250 New
- Florida Virtual Campus   56,198 Ex
- FL Comm. Coll. D.L. Consortium 85,278 Ex
- Maryland Online: 27,060 Ex
- Georgia Globe: FY2002:   40,000 Ex
- Illinois Virtual Campus: 46,678 Ex
- eArmyU (23 campuses)   12,000 New
- Connecticut D. L. Consortium   9,683 Ex
- UMassOnline   11,239 New
  - Ex=>primarily existing students
  - New=>primarily new online students   (2002 data)

For-profits

- Phoenix   37,000 / 110,000
- Capella   5,000 / 5000
- DeVry   ? / 56,000
- Strayer   ? / 14,000
- Sylvan (NTU)   ?
  - (Walden U, NTU, Canter, Caliber, iLearning, etc.)

Models for Virtual Universities

- For Profit Universities
  - Pure plays: Phoenix, Capella, DeVry University, Strayer University etc.
  - Joint Ventures: Cardean, Caliber, Pensare, U21
  - Internal: eCornell, Fathom etc.
    - (formerly UMUC,NYUOnline)
  - Outside VC (Original Fathom plan) versus internal
- Not for Profit
  - Internal Collaborative (UMassOnline etc.)
  - Independent (WGU, etc)
  - Solo or Consortia (UMUC)

Higher Ed. Strategies for Online Ed.

- Technology learning strategies have been developed in the following categories:
  - Cost Avoidance: Can an institution serve larger and larger constituencies without additional investments in physical plant and infrastructure.
  - Cost Reduction: Can an institution become more productive through the use of technology and thereby reduce costs.
  - Revenue Enhancement: Can an institution increase its revenues by marketing their programs to a much wider audience (i.e. regional, national or international).

Cost avoidance

- How can we serve an increasing number of potential students without building additional campuses or buildings.

- Example: California Tidal wave II
  - a 40% increase in students in first decade of the millennium
  - "One of the major reasons behind the creation of the CVU includes the increasing needs of business and industry for employee training, particularly to fit varying schedules. In addition, the projected demands from the 400,000 new CCC students expected from Tidal Wave II over the next seven years can not be met with the current rate of capital construction in the CCC's. "
    - http://www.tipsnews.org/newsletter/98-02/cvu.html

Cost Avoidance

- Ex: Western Governor's University (WGU)

- In areas of the country that are growing rapidly, there is little hope of being able to keep up with the demand by building new campuses. Virtual universities have been seen as the answer.

- Conclusion: Thus far this has not established itself as a credible option.
  - The jury is still out!

Cost reduction

- Pew Grant Program in course redesign
  - "The purpose of this institutional grant program is to encourage colleges and universities to redesign their instructional approaches using technology to achieve cost savings as well as quality enhancements. Redesign projects focus on large-enrollment, introductory courses, which have the potential of impacting significant student numbers and generating substantial cost savings."
    - http://Center.rpi.edu

- Examples can be found on their web site.
  - Carol Twigg and I founded this Pew Center for Academic Transformation together.
  - Goal : Improve Quality, Access, and Cost.

Cost reductions

- ## University of Central Florida
  - "… substituting Web-based, asynchronous, modular learning for two-thirds of the in-class time and creating small collaborative learning groups within this online structure."

- ## University of Wisconsin
  - "… substituting Web-based, asynchronous, modular learning for two-thirds of the in-class time and creating small collaborative learning groups within this online structure." "UW Madison expects to reduce the cost-per-student from about $257 to $185, a reduction of 28%. Because this course affects 4,100 students per year, this saving translates to an annual saving of approximately $295,000."

Cost reductions

- In the first round of the Pew Program 10 institutions project an average cost savings of 37%.

  - IUPUI, Penn State, Rio Salado, U. Buffalo, U. Central Florida, U. Colorado Boulder, U. Illinois, U. So. Maine, U. Wisconsin Madison, Virginia Tech.

- Staff analysis showed an actual cost savings of 33% after implementation

  - http://center.rpi.edu/PewGrant/Rd1saving.html

- Possible? Definitely!   Easy? Not at all.

Cost reductions -summary

- In spite of all the "experts" telling us that there is no way to save money using technology…..
- Technology has proven itself beyond a shadow of a doubt to be an effective way to reduce costs.
- How to explain this disagreement?
  - There are lots of poorly designed and expensive innovations out there.
  - For political reasons, some try to attribute the dramatic increase in cost of technology to the education programs.
  - Innovations that are well designed pedagogically and from a business perspective can be a tremendous improvement in quality, access, and COST!

The transmission model

- ## The mainframe approach
  - Face to Face: The Lecture

  - Distance: TV (Cable or Satellite)
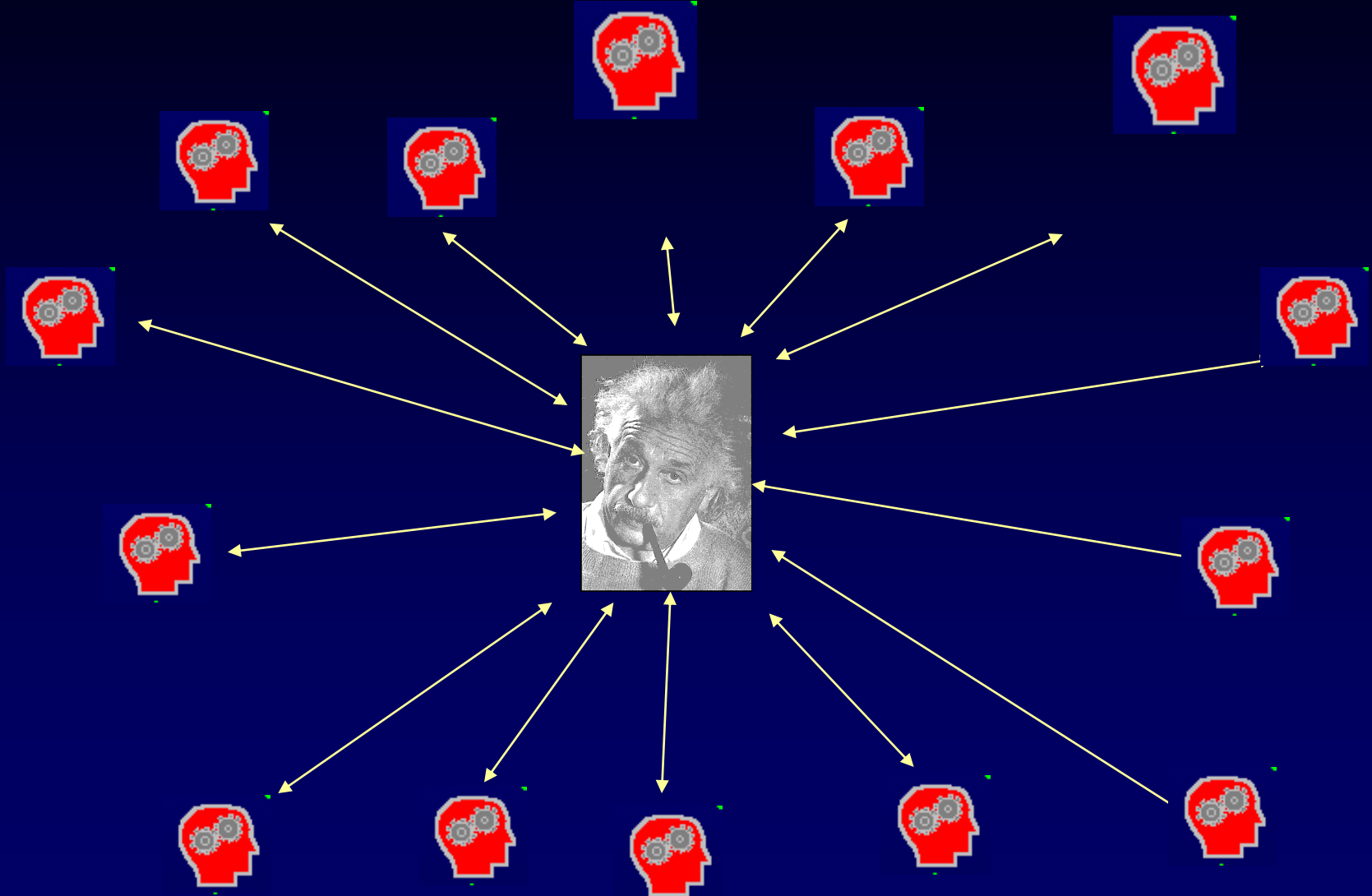   - Pushes the back wall out a few thousand miles
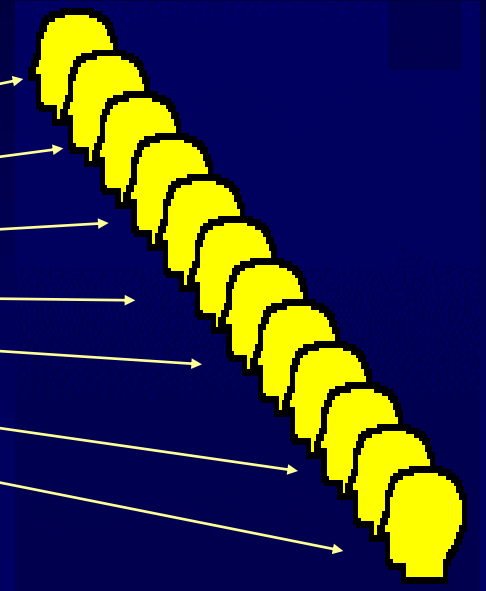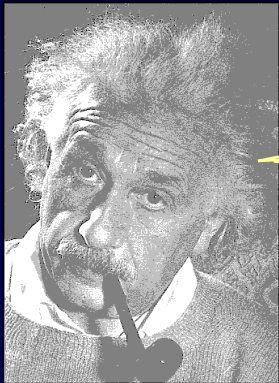
Distributed Collaborative Model
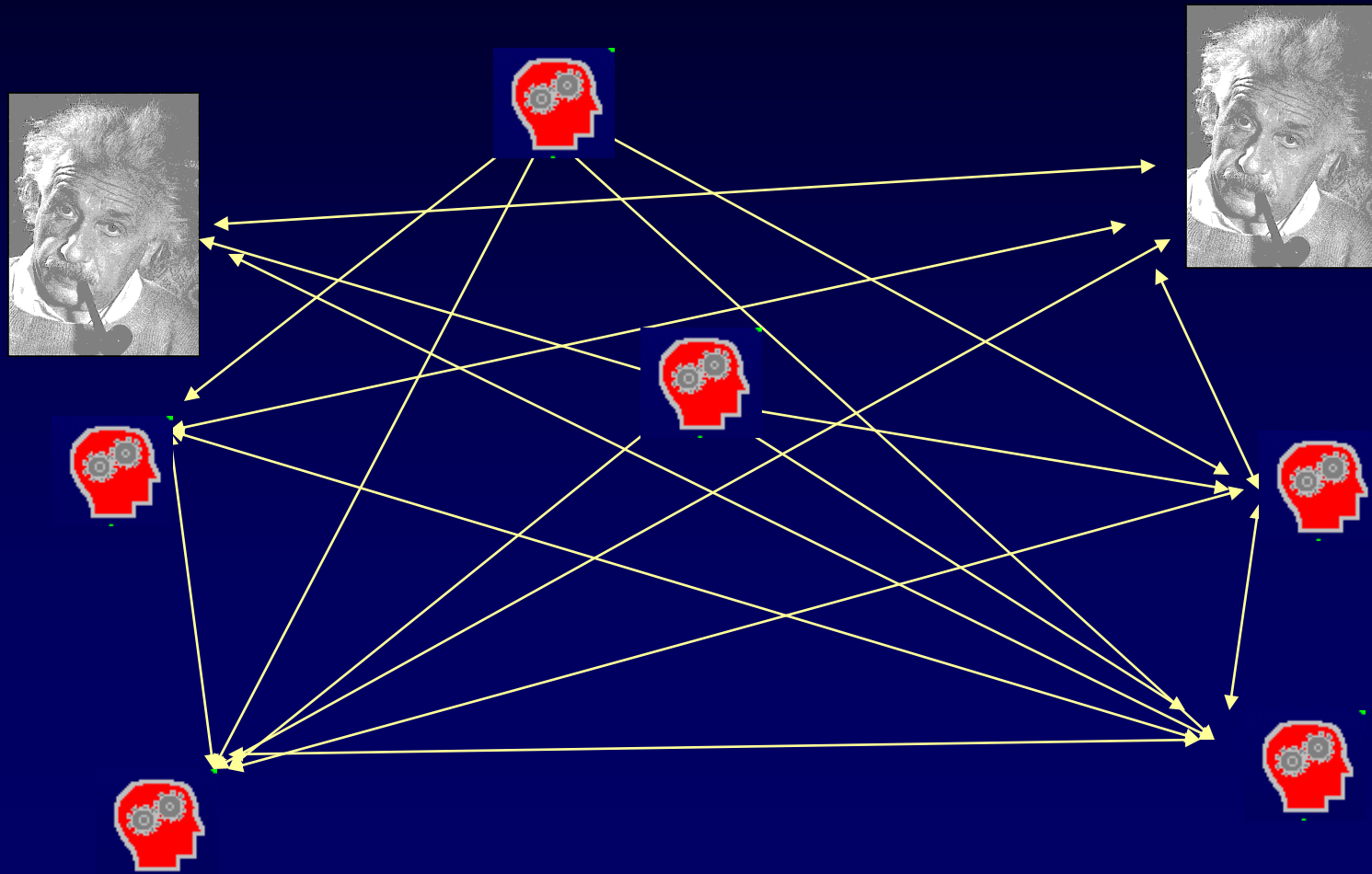
How not to organize online learning…..

"The 24-Hour Professor;" Chronicle of Higher Ed; May 31, 2002

The 24 hour professor

- I was torn between thinking:
  - "what a wonderful dedicated professor!"
  - and
  - "what a complete idiot for designing a course that assumes that the only valid interactions are between him and the student."

- What about peer learning, virtual team approaches, interactions with rich media materials?

- Good pedagogy also happens to be more efficient!
  - More on this later

The Studio at a Distance

UMass: www.UMassOnline.net   Wilson: www.JackMWilson.com
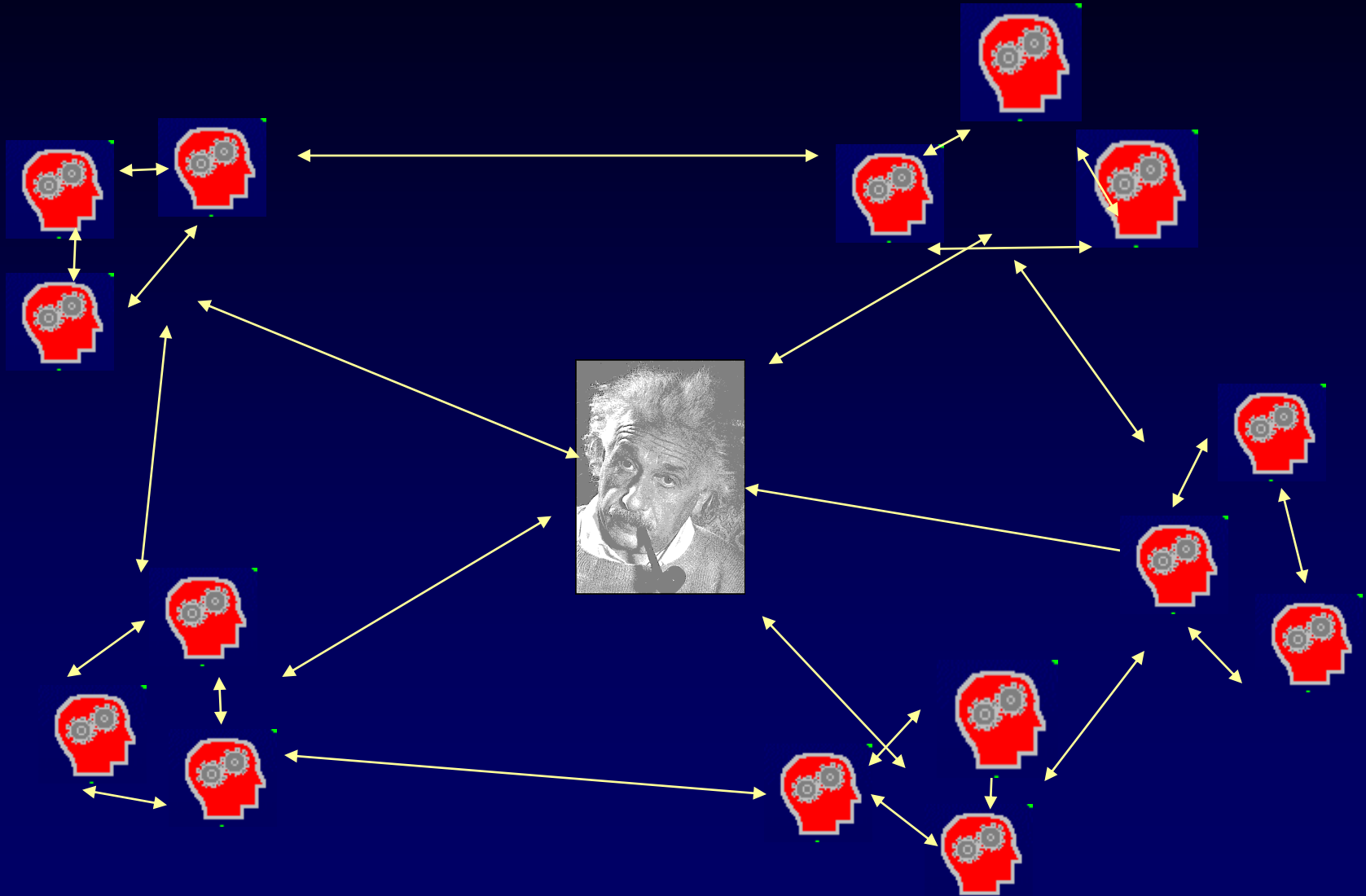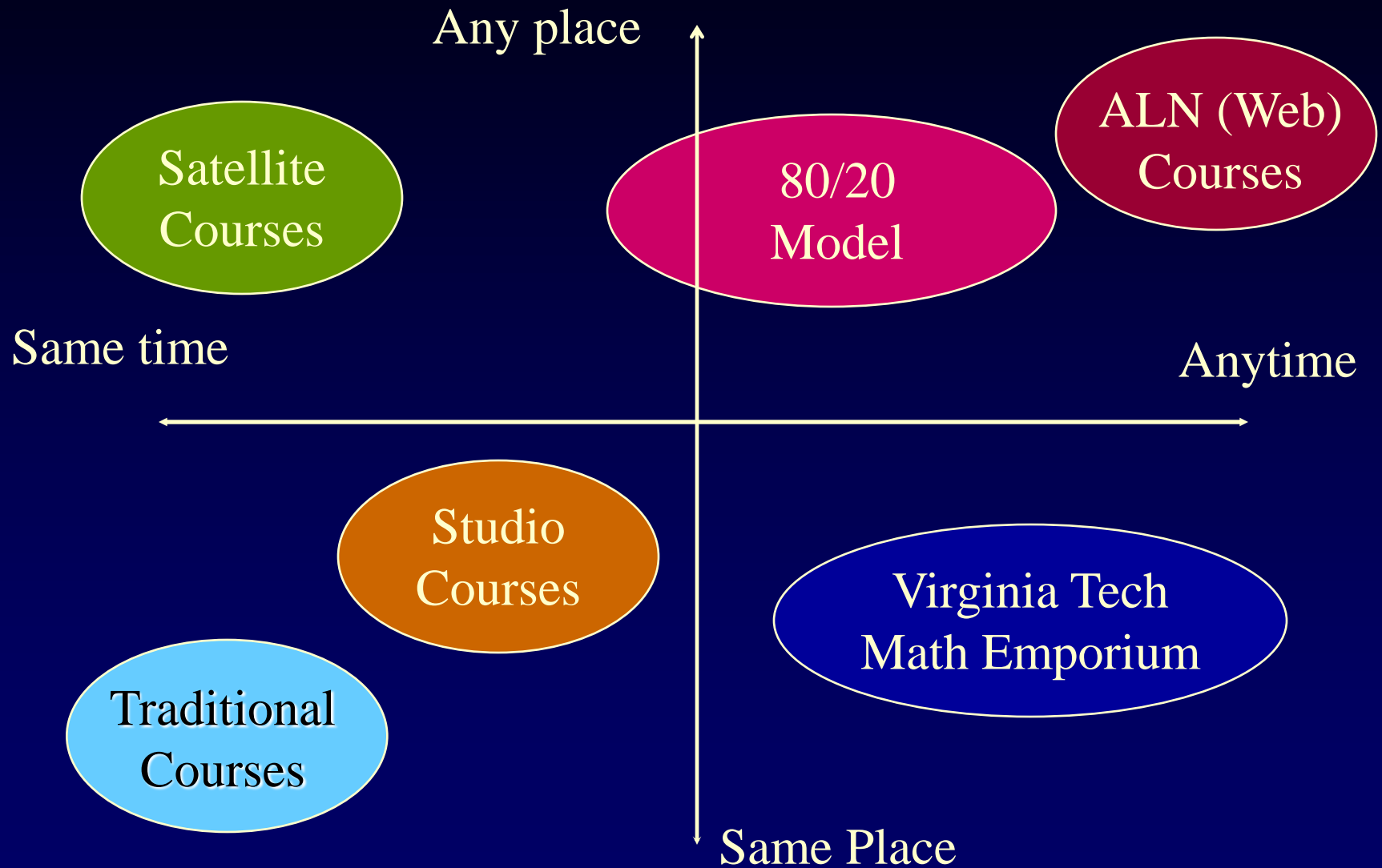
Studio at a Distance

- Delivery on standards based multimedia PC's equipped for live video/audio interactions and connected to a robust ip multi-casting network.
- A mix of synchronous and asynchronous activity.
- Use of Web and/or CD-ROM based multimedia materials.
- Use of professional quality software tools for CAD, symbolic math, spreadsheets, word processing, etc.
- Live audio and/or video interactions among the students and with faculty.
- Email interactions among the students and faculty.
- Small group discussions.
- Collaborative software for application sharing over the network.
- Access to rich resources on the network.
- Ability to "pass the floor" to students to allow them to lead the class through an activity.
- Course administration software to track student progress.
- Classes with a mix of students in traditional and workplace settings.
- Classes with a global perspective and global audience.

UMass: www.UMassOnline.net   Wilson: www.JackMWilson.com

UMassOnline.net

- Built upon the successes of the 5 campuses.

- One of the largest in the U.S.
  - 11,239 enrollments in AY 2002-2003

- Portal: www.UMassOnline.net
  - Launched in spring 2001

- Closely coupled to the University mission

- Operates over the M.I.T.I.
  (Massachusetts Information Turnpike Initiative)

- Received $ 2.25 million IT Bond funding to create statewide platform in partnership with M.I.T.I.
  - Eventually open to all state institutions

Investing and Developing Programs

- ## Thirty Eight degree and certificate programs
  - Bachelor's, Master's, and Certificate programs
  - 12 new programs last fall
- ## Three of our programs have been recognized by US News and World Report as top on-line programs in the October 15, 2001 issue.
  - MBA – UMass Amherst
  - MEA – UMass Lowell – Ed. Administration
  - MPH – UMass Amherst- Public Health

Serving Community Needs

- BSIT *
- MSIT
- M.S. Joint Comp. Science Comp. Engineering
- Nursing *
- MBA *
- MPH *
- MS Substance Abuse Professionals
- BLA – Liberal Arts *
- Degree Completers and many others

Graduate Programs

- M.S. in Electrical and Computer Engineering (VIP Amherst)
- M.S. in Engineering Management (VIP Amherst)
- M.S. in Computer Science (VIP Amherst)
- M.S. in Information Technology (Boston)
- M.Ed. for Science Teachers Program (Amherst)
- M.S. in Comp. Sci. and Comp. Engineering (Amherst)
- M.Ed. in Counseling: School Guidance (Boston)
- M.Ed. in Counseling: Mental Health Counseling (Boston)
- M.S.(Nursing) Community/School Health (Amherst)
- M.S. in Criminal Justice (Lowell)
- M.Ed.(M.Ed.) (Lowell)
- MBA Professional Program (Amherst)
- MPH in Public Health Practice (Amherst)

Graduate Certificates

- Certificate in Photonics and Optoelectronics (Lowell)
- Certificate in Foundations of Business (Lowell)
- Certificate: Adapting Curriculum Frameworks for All Learners (Boston)
- Post Master's Nurse Practitioner Certificate (Boston)
- Certificate in Clinical Pathology (Lowell)
- Certificate in Foundations of Business (Lowell)
- Certificate in Instructional Technology Design (Boston)

Undergraduate Degree Programs

- Bachelor of Business Administration

- Bachelor of Liberal Arts (Lowell)

- Bachelor of Science in Hotel, Restaurant, and Travel Administration (Amherst)

- Bachelor of Science in Information Technology   (Lowell)

- Bachelor's Degree in Information Technology: Business Minor (Lowell)
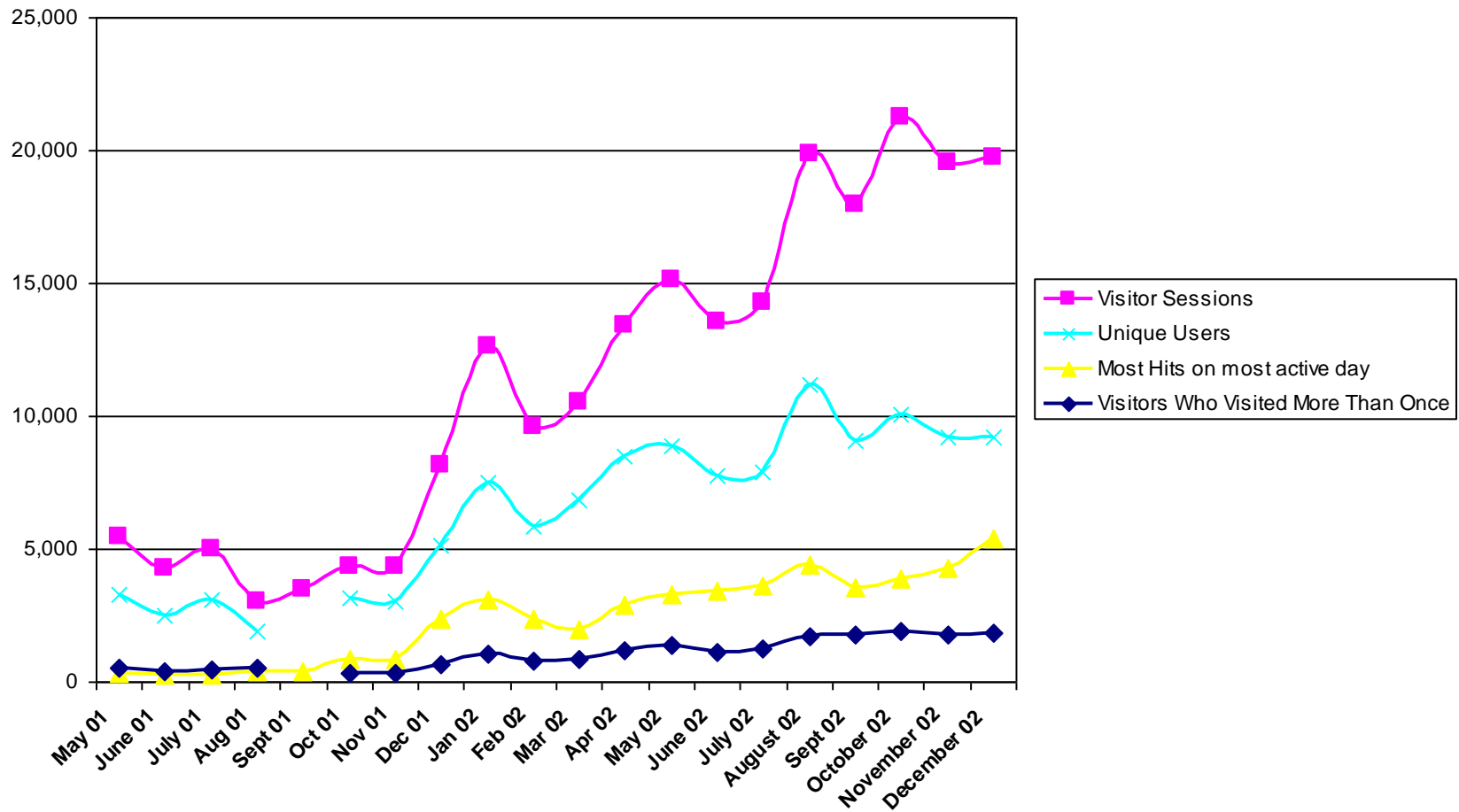
- RN to Bachelor of Science (Nursing) (Amherst)

Other Undergraduate Programs

- Associate of Science in Information Technology (Lowell)
- Certificate in Communication Studies (Boston)
- Certificate in Contemporary Communications (Lowell)
- Certificate in Data/Telecommunications (Lowell)
- Certificate in Fundamentals of Information Technology (Lowell)
- Certificate in Intranet Development (Lowell)
- Online Communications Skills Certificate (Dartmouth)
- Certificate in Multimedia Applications (Lowell)
- Certificate in Community Media and Technology (Boston)
- Criminal Justice Series (Amherst)
- Certificate in UNIX (Lowell)
- Fundamentals of Arts Management Certificate Program (Amherst)
- Certificate in Plastics Technology (Lowell)
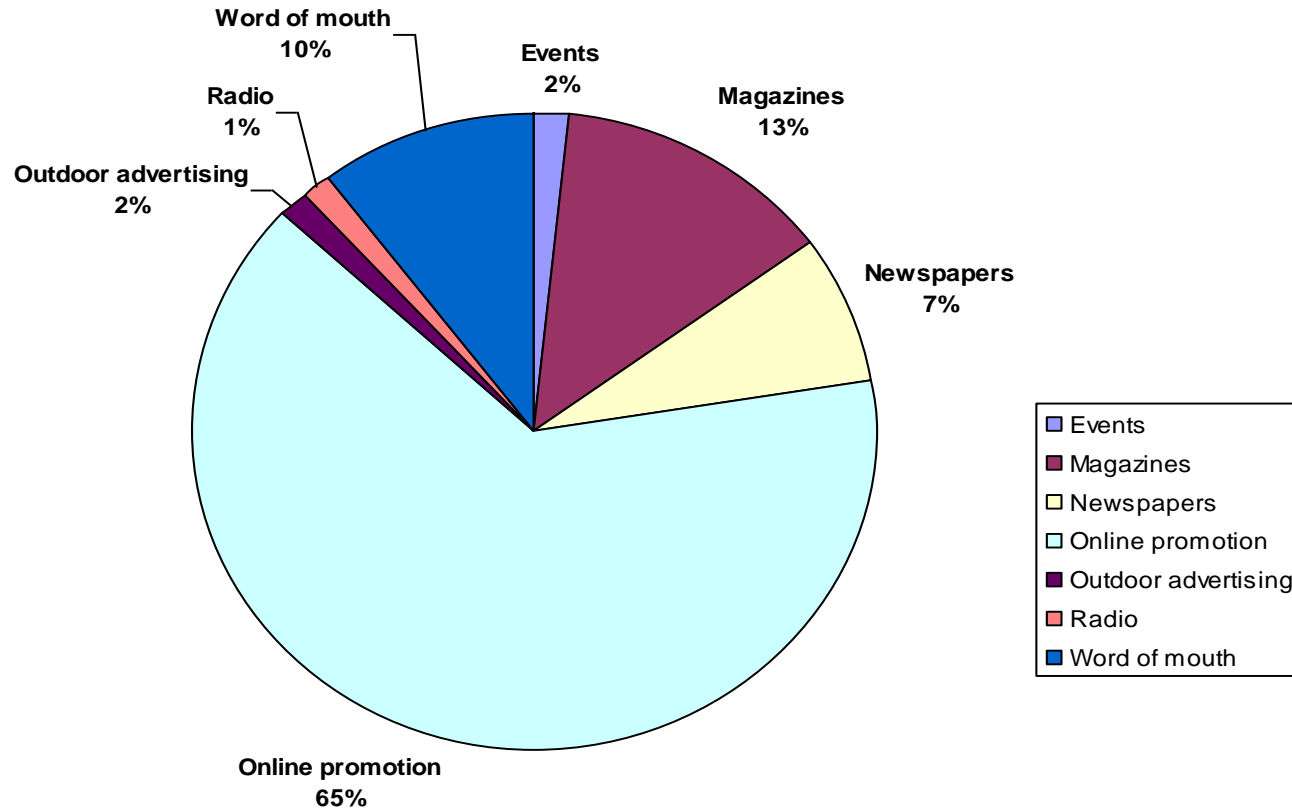- Certificate in Technical Writing (Boston)

UMass: www.UMassOnline.net   Wilson: www.JackMWilson.com

Growth in inquiries

UMOL Traffic

Legend:
- Visitor Sessions
- Unique Users
- Most Hits on most active day
- Visitors Who Visited More Than Once

What is working?

Lead Sources

- Events — 2%
- Magazines — 13%
- Newspapers — 7%
- Online promotion — 65%
- Outdoor advertising — 2%
- Radio — 1%
- Word of mouth — 10%

Most popular programs.

- Bachelor of Liberal Arts (UMass Lowell)
  - 689 inquiries
- MBA Professional Program (UMass Amherst)
  - 532 inquiries
- Bachelor of Science in Information Technology (combined with BS in IT with Business Minor) (UMass Lowell)
  - 413 inquiries
- B. S. in I.T. - Business Minor (UMass Lowell)
  - 383 inquiries

- And these represent only 3% of the inquiries that identify themselves! 97% of customers

Where do they come from?

Results: State	Inquiries	Percent of total
Massachusetts	780	29%
California	194	7%
New York	193	7%
Texas	132	5%
Florida	118	4%
New Jersey	100	4%
Pennsylvania	86	3%
Georgia	85	3%
Virginia	73	3%
Connecticut	64	2%

The Tower of Babel

- When I arrived in 2001, UMass was running eight (8) different learning management systems in production.
  - Three home grown
  - Five Commercial
- Nearly completely down to UMassOnline Platform at this point with one major exception.

Technologies in Use

- Satellite Video
- ISDN Videoconferencing
- CD-ROM Creation
- Mail out materials (including videotapes and/or CD's)
- World Wide Web materials
- Asynchronous Tools: Prometheus and IntraLearn
- Streaming Video
- Live-Online Learning (LearnLinc or Centra)
  - Desktop Video (multicast)
  - Network based materials management
  - Classroom management

Cost Deflation

- ## Satellite Video
  - ($500,000)
- ## ISDN Videoconferencing
  - ($50,000)
- ## PC Collaborative
  - ($2,000)
- ## CD, DVD or Web Based Asynchronous
  - ($2,000)
- ## Live Online Learning (LearnLinc, Centra, etc)
  - ($2,000)

(Cost is being radically reduced)

Cost of DL system

	Satellite	VideoConf.	PC
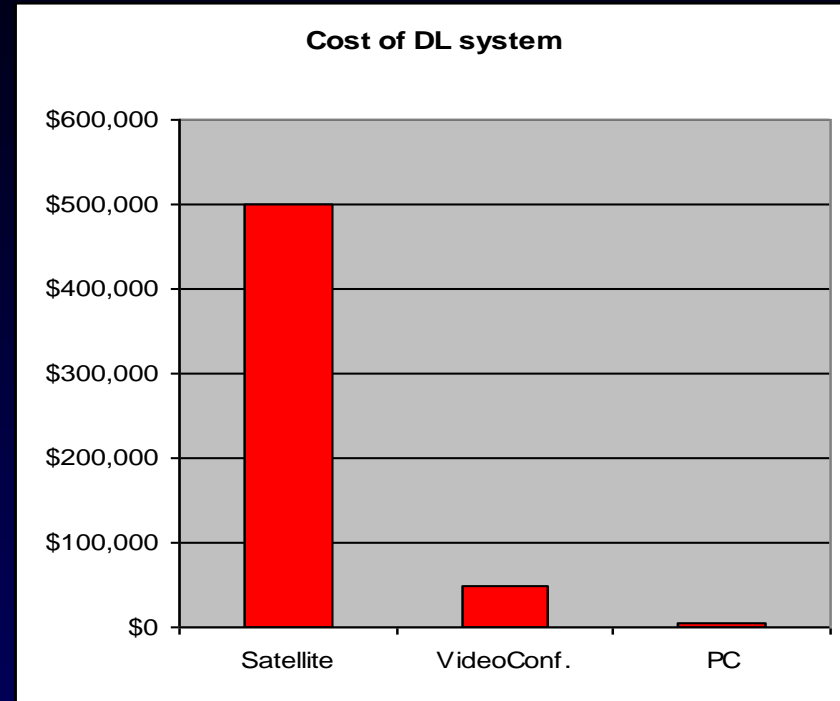
Platform

- IntraLearn – Commercial LMS
- Prometheus- Community Source LMS
- Centra- Live on line learning
- OWL- Testing Online
- Real Servers
- Quicktime Servers
- PeopleSoft: SIS, HR, and Financial

  – We have "only just begun."
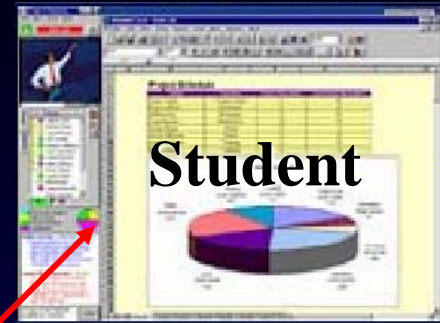
Platform Strategy

- No specific vendor reliance

- Portal wraps both

- Common Database

- Interchangeable parts

- Scaleable
  - (over 20 million Prometheus interactions in last 1.5 years.)

- Charges on CE use 7.5% of revenue
  - 11,239 enrollments

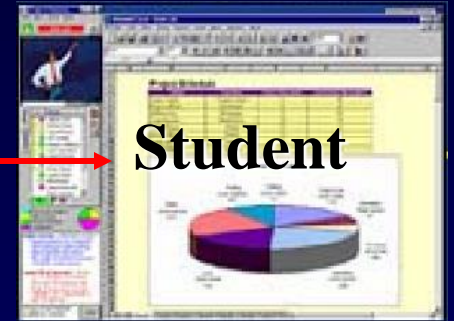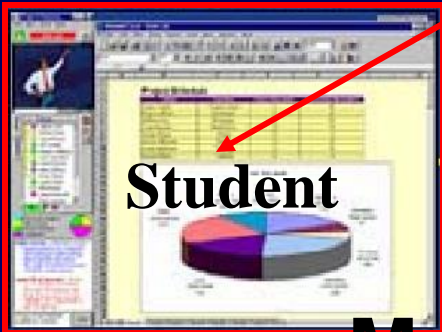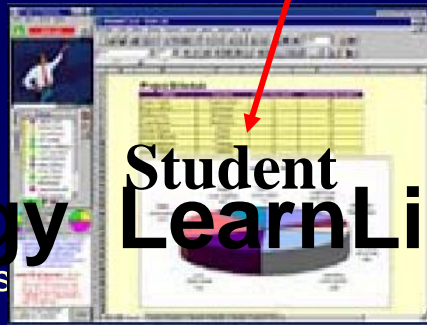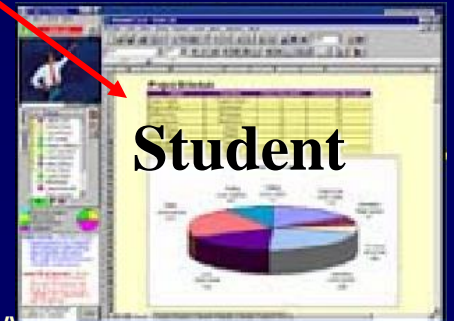- Free to on campus students and all faculty
  - < 50,000
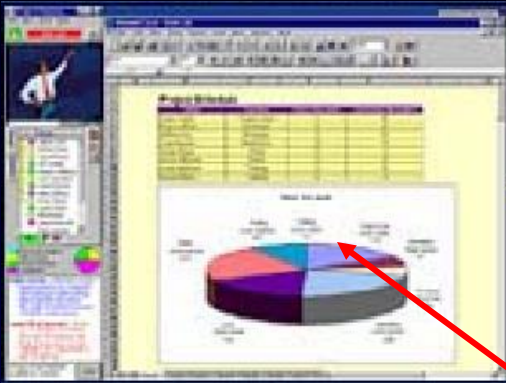
Mentergy LearnLinc

Introduction to **e**Business

- Two thirds canonical ALN model
- One night per week from 6:30-8:30 pm
  - Fall 2000: 50 On Campus & 75 Off Campus Students
  - Spring 2001: 75 overflow students (25 on and 50 off)
    - IBM, Ford, GE, Lockheed Martin, Pratt and Whitney, Ford, Consolidated Edison, NY Power, J. P. Morgan, Carrier, Otis, etc.
  - Extensive Website:
    - http://www.jackmwilson.com/eBusiness/Syllabus-Spring2001/
  - MBA, MSIT, MS in Engineering Science
  - miniLectures, Discussion, Student presented cases, & asynchronous interactions
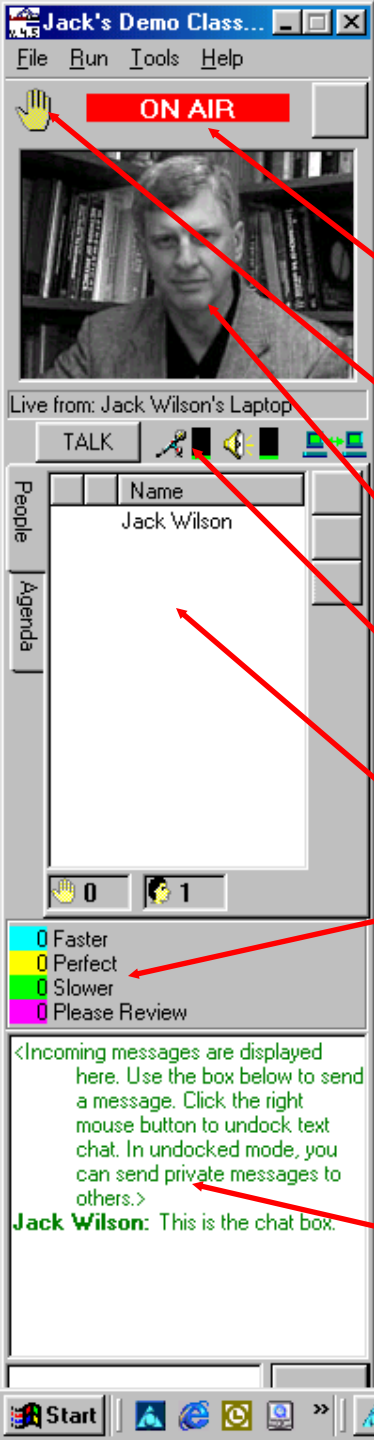
- On- Air indicator
- Raise your hand
- Picture or video of speaker
- Audio and Network controls
- Agenda or class roll
- Feedback section (also Q n A)
  – (can be pace, agreement, T/F, Yes/No, etc.)
- Chat Window (also Whiteboard etc.)

Are you feeling a bit overwhelmed?

- The restructuring of the curriculum cannot be allowed to disrupt the students' experience

- Ever feel like you are building a plane in flight?

UMass: www.UMassOnline.net   Wilson: www.JackMWilson.com
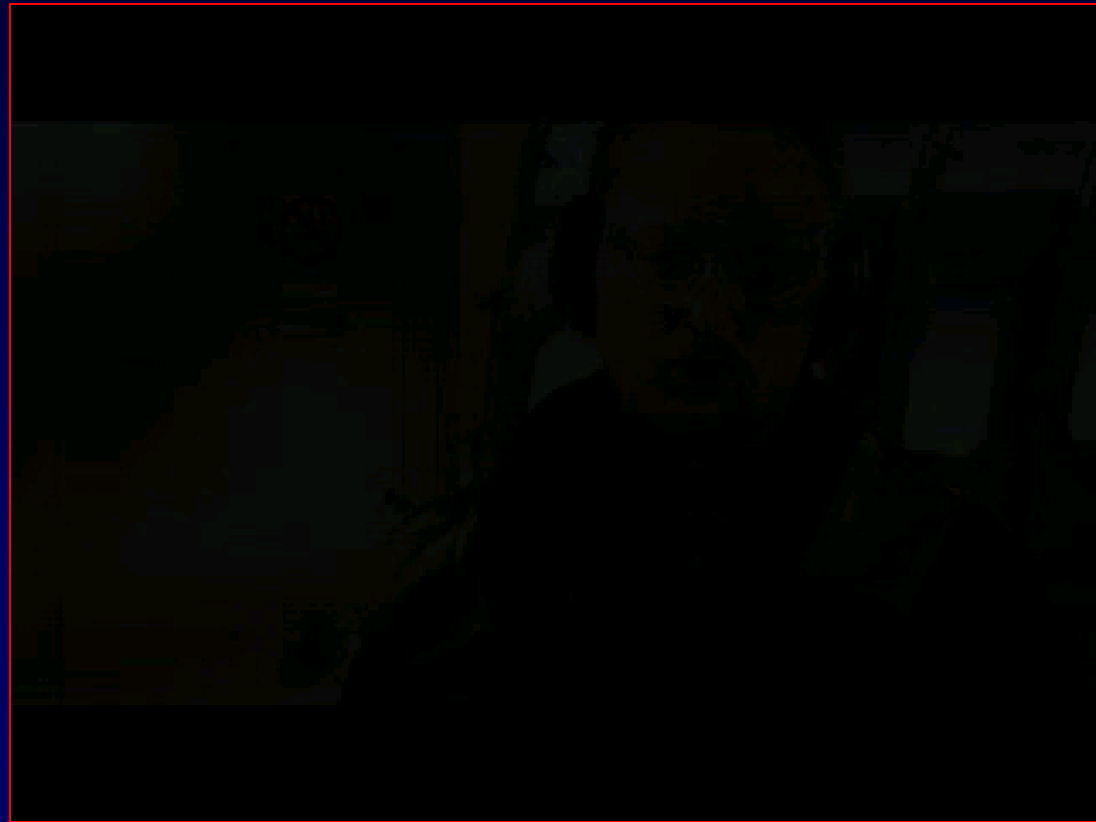
TE³ Ten Commandments

1. Restructure around the learner. Neither over-emphasize nor under-emphasize technology.

2. Build upon research results, which inform design; don't try to reinvent the wheel.

3. Remember that technology has an intrinsic educational value beyond helping students learn better.

4. Do systematic redesign and not incremental add-ons. There is always a tendency to just add on a few computer experiences to everything else. By definition this costs more, is more work for faculty, and adds to the students' burden.

5. Benchmark your plans and build upon examples of systematic redesign. Do not automate the lecture. Find the best examples and build upon them.

* TE³ = TEEE – Technology Enhanced Engineering Education

6. Count on Moore's law ("What is hard today is easy tomorrow"). *- For example, CPU power and bandwidth have consistently improved.*

7. Cost is an important aspect of quality. There is no lasting quality if there has been no attention to cost. *- There are more than enough examples of expensive high quality solutions. We need inexpensive high quality solutions!*

8. Avoid pilots that linger. Design for a large scale and pilot projects only as a prelude to scaling up. *It is easy to design innovative educational experiences that work for small groups. It is harder to address the needs of the 1000 students taking calculus I at the large research university.*

9. Develop a balance between synchronous and asynchronous distributed learning.

10. There is no longer any way to do good scholarship without technology, and there is no longer any way to teach good scholarship without technology.

Helpful links

- UMassOnline: www.UMassOnline.net
- Pew Center for Academic Transformation
  - http://Center.rpi.edu
- Pkal; www.pkal.org
- Hesburgh awards – faculty dev. Focus
- Pew Prizes – institutional focus
- EDUCAUSE- www.educause.org
- Syllabus – www.syllabus.com
- EdMedia - http://www.aace.org/conf/edmedia/default.htm
- TLTR and Flashlight: http://www.tltgroup.org/

Jack M. Wilson

JackMWilson@JackMWilson.com

http:\\www.JackMWilson.com

The End

What shapes my views?

- ## Service as:
  - Founding Chief Executive Officer (CEO) of UMassOnline
  - 33 years as a professor, department chair, research center director, dean (4 times), and provost
  - Recently at RPI: J. Erik Jonsson '22 Distinguished Professor of Physics, Engineering, Information Technology, and Management.

- ## Founder, CEO, Chairman of LearnLinc
  - a successful eLearning Co
  - Now Mentergy Corporation (NASDAQ: MNTE)
  - Sold in February 2000.

Other interests

- Formerly
  - Provost (interim)
  - Dean of Faculty
  - Dean of Undergraduate Ed.
  - Dean of Professional Ed.
  - Director, Center for Innovation in Undergraduate Ed.
  - Chair, Physics Department
  - Professor for 30 years +

What else shapes my views?

- Industry Consultant (IBM, AT&T, Lucent, Ford, GM...)
- U.S. Army TRADOC Advisory Committee
- Pew Center for Academic Transformation ($8.8 M)
- One of founders of the National Learning Infrastructure Init.(NLII)
- Chair, NY State Task Force on Distance Learning
- Former Executive Officer of AAPT (Physics) in Wash. DC: 8 yrs on Science Education: HS. and Univ.
- National Acad. of Science/National Research Council
  - Committees on Information Tech., Physics Decadal Overview Committee, and National Digital Library Committee
- Lots of visits, speeches, writing, reading, and visitors

The Studio at other Universities

- **The University of Amsterdam (**http://www.science.uva.nl/research/amstel/)
- **Penn State University** (http://www.science.psu.edu/facaffairs/strategic.htm) (http://www.psu.edu/ur/archives/news/GE.html) (http://dps.phys.psu.edu/about.htm)
- **Arizona State University** (http://www4.eas.asu.edu/phy132/)
- **Indiana State Univ**. (http://physicsstudio.indstate.edu/)
- **Cal Poly San Luis Obispo** (http://www.cob.calpoly.edu/Evan/polyplan/polyplan.htm) (http://chemweb.calpoly.edu/phys/)
- **Ohio State University** (http://www.physics.ohio-state.edu/~ntg/26x/2064_pictures.html)
- **The University of Amsterdam** (http://www.wins.uva.nl/research/amstel/)
- **The University of New Hampshire** (http://einstein.unh.edu/academics/courses/)
- **Curtin Univ. of Tech. (Australia)** (http://www.physics.curtin.edu.au/teaching/studio/)
- **Univ. Of Mass. –Dartmouth** (http://www.aps.org/meet/CENT99/BAPS/abs/S3455002.html)
- **The Colorado School of Mines** (http://einstein.mines.edu/physics100/frontend/main.htm)
- **Acadia Univ. (Canada)** (http://ace.acadiau.ca/math/boutilie/)
- **Santa Barbara City College** (http://www.cs.sbcc.net/physics/redesign/final_report/reportb.html)